

# Image Immunizer an Image Tamper Resilient Multi Task Learning Scheme for Image Lossless Auto-Recovery

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**Abstract:** Digital images are susceptible to a range of vulnerabilities and threats that can compromise security and privacy in online social networking sites. Image tampering attacks involve the unauthorized or deceptive alteration of digital images, often for the purpose of misrepresenting their content or context. Once the images are manipulated, it is hard for current techniques to reproduce the original contents. To address these challenges and combat image tampering, research on image tamper localization has garnered extensive attention. Image Processing and Machine Learning techniques have bolstered image forgery detection, primarily focusing on noise-level manipulation detection. Furthermore, these techniques are often less effective on compressed or low-resolution images and lack self-recovery capabilities, making it challenging to reproduce original content once images have been manipulated. In this context, this project introduces an enhanced scheme known as Image Immunizer for image tampering resistance and lossless auto-recovery using Vaccinator and Invertible Neural Network a Deep Learning Approach. Multitask learning is used to train the network, encompassing four key modules: apply vaccine to the uploaded image, ensuring consistency between the immunized and original images, classifying tampered pixels, and encouraging image self-recovery to closely resemble the original image. During the forward pass, both the original image and its corresponding edge map undergo transformation, resulting in the creation of an immunized version. Upon receiving an attacked image, a localizer identifies tampered areas by predicting a tamper mask. In the backward pass with Run-Length Encoding, hidden perturbations are transformed into information, facilitating the recovery of the original, lossless image and its edge map, ensuring image integrity and authenticity. This proposed technique achieves promising results in real-world tests where experiments show accurate tamper localization as well as high-fidelity content recovery.

**Keywords:** OSN, Forward Pass, Run length encoding, Tamper, Localization.